REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application are unpatentable or obvious under the provisions 35 U.S.C. §§ 101 and 103. The Applicants herein amend claim 6. Support for the amendment may be found in the Applicants' specification on at least paragraphs [0093]-[0095]. Thus, the Applicants believe that all of these claims are now in allowable form.

I. REJECTION OF CLAIMS 6-10 UNDER 35 U.S.C. § 101

The Examiner rejected claims 6-10 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. The Applicants submit that claim 6 clearly recites a database that is tied to a statutory class such as an apparatus. However, further responsive to the Examiner, the Applicants herein amend claim 6 to recite the use of a computer having a query optimization module for the receiving and applying steps. Thus, the Applicants submit that claims 6-10 are tied to another statutory class. As a result, claims 6-10 fully satisfy the requirements of 35 U.S.C. § 101 and request the rejection be withdrawn.

II. REJECTION OF CLAIMS 6-10 UNDER 35 U.S.C. § 103

A. Claims 6-7

The Examiner rejected claims 6-7 as being unpatentable under 35 U.S.C. § 103 over Chaudhuri, et al. (U.S. Patent Publication No. 2004/0003004, published on January 1, 2004, hereinafter referred to as "Chaudhuri") in view of Ruetsch (U.S. Patent No. 7,295,956, issued on November 13, 2007, hereinafter referred to as "Ruetsch") and in further view of Levy, et al. (U.S. Patent No. 6,088,524, issued on July 11, 2000, hereinafter referred to as "Levy") The Applicants respectfully traverse the rejection.

Chaudhuri teaches time-bound database tuning. Chaudhuri teaches time-bound tuning in database system using a query language such as Structured Query Language (SQL). (See Chaudhuri, para. [0025]).

Ruetsch teaches a method and apparatus for using interval techniques to solve a multi-objective optimization problem. (See Ruetsch, Abstract).

Levy teaches a method and apparatus for optimizing database queries involving aggregation predicates. (See Levy, Abstract).

The Examiner's attention is directed to the fact that Chaudhuri, Ruetsch and Levy, alone or in any permissible combination, fail to teach or suggest a method to provide a data management system comprising identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$, receiving at a computer having a query optimization module a query having aggregation constraints, wherein said aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs) and providing a result, wherein said result is an approximation, as positively recited by the Applicants' independent claim 6. Specifically, independent claim 6 positively recites:

> 6. A method to provide a data management system, comprising:
> preprocessing a database having a relation to produce an index, wherein said preprocessing step comprises:
> identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$;
> receiving at a computer having a query optimization module a query having aggregation constraints, wherein said aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs);
> applying at said computer having said query optimization module said index to look up a result in response to said query having aggregation constraints; and
> providing said result, wherein said result is an approximation. (Emphasis added).

In one embodiment, the Applicants' invention teaches a method to provide a data management system comprising identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$, receiving at a computer having a query optimization module a query having aggregation

constraints, wherein said aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs) and providing a result, wherein said result is an approximation. For example, the dominating vector of constants $\bar{c}'$ can be identified that may correspond to an OPAC query having the maximum profit. (See e.g., Applicants' specification, paragraphs [0059-0063], [0067]). By using the dominating vector, an approximate answer that is at least as good as an exact answer may be provided in response to the query. (See e.g., *Id.* at para. [0079]). This provides a more efficient technique for answering OPAC queries by trading an acceptable level of accuracy in return for efficiency. (See e.g., *Id.* at para. [0047] and [0051]).

In contrast, Chaudhuri, Ruetsch and Levy alone or in any permissible combination, fail to teach or suggest a method to provide a data management system comprising identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$, receiving at a computer having a query optimization module a query having aggregation constraints, wherein said aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs) and providing a result, wherein said result is an approximation.

The Applicants note that Chaudhuri is not concerned with receiving queries and providing answers to the queries. Notably, Chaudhuri simply teaches a method for database tuning. That is, Chaudhuri provides a way to properly configure a database based upon various parameters, but does not teach or suggest a method for efficiently returning an answer for the query. (See Chaudhuri, Abstract, para. [0023] - [0040]). Thus, Chaudhuri fails to teach or suggest any of the above limitations above.

Moreover, the Examiner concedes that at a minimum Chaudhuri fails to teach or suggest identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$, receiving at a computer having a query optimization module a query having aggregation constraints, wherein said

aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs) and providing a result, wherein said result is an approximation. (See Office Action dated 12/23/08, p. 4, ll. 3-12).

The Examiner asserts that Ruetsch teaches the limitations of identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$. However, Ruetsch actually teaches away from the Applicants' invention because Ruetsch only teaches that non-dominate sub-domains are identified and the non-dominate sub-domains are eliminated. (See Ruetsch, col. 2, ll. 61-65; col. 8, ll. 6-28 and col. 10, ll. 48-52). In other words, Ruetsch does not know whether a single domain is a dominate domain. Rather, Ruetsch simply teaches that a sub-domain may be identified that is dominated by at least one other sub-domain. For example, the remaining Pareto front or line comprises points that are non-dominated. (See Ruetsch, col. 5, ll. 33-34). In other words, Ruetsch does not know which points on the Pareto front are a dominant sub-domain, but simply seeks to remove any sub-domain that may be dominated. In other words, Ruetsch fails to teach that any particular point in the Pareto front of non-dominated points is a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$.

Moreover, Levy fails to bridge the substantial gap left by Chaudhuri and Ruetsch. Levy appears to only teach providing an exact answer to the optimization queries. In other words, Levy also fails to teach or suggest identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$ which allows the system to provide a result, wherein said result is an approximation. Thus, the combination of Chaudhuri, Ruetsch and Levy fails to render obvious the Applicants' independent claim 6.

Furthermore, dependent claim 7 depends from independent claim 6 and recites additional limitations. For the same reasons discussed above, dependent claim 7 is also not made obvious in view of Chaudhuri, Ruetsch and Levy and is

allowable. As such, the Applicants respectfully request the rejection be withdrawn.

B. Claims 8-10

The Examiner rejected claims 8-10 in the Office Action under 35 U.S.C. §103 as being unpatentable over Chaudhuri in view of Ruetsch and Levy and in further view of U.S. Patent No. 6,122,628, issued on September 19, 2000, hereinafter referred to as "Castelli." The Applicants respectfully traverse the rejection.

The teachings of Chaudhuri, Ruetsch and Levy are discussed above. Castelli teaches multidimensional data clustering and dimension reduction for indexing and searching. (See Castelli, Abstract).

The Examiner's attention is directed to the fact that Chaudhuri, Ruetsch, Levy and Castelli, alone or in any permissible combination, fail to teach or suggest the novel method to provide a data management system comprising identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$, receiving a query having aggregation constraints, wherein said aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs) and providing a result, wherein said result is an approximation that is within an acceptable level of accuracy, as positively claimed by the Applicants. (See *supra*).

As discussed above, Chaudhuri, Ruetsch and Levy, alone or in any permissible combination, fail to teach or suggest a method to provide a data management system comprising identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$, receiving a query having aggregation constraints, wherein said aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs) and providing a result, wherein said result is an approximation. Moreover, Castelli fails to bridge the substantial gap left by Chaudhuri, Ruetsch and Levy because Castelli also fails to teach or suggest a method to provide a data management system comprising

identifying a dominating vector of constants, $\bar{c}'$ for a given n-dimensional vector of constants $\bar{c}$, receiving a query having aggregation constraints, wherein said aggregation constraints are Optimization under Parametric Aggregation Constraints (OPACs) and providing a result, wherein said result is an approximation. Castelli only teaches multidimensional data clustering and dimension reduction for indexing and searching. (See Castelli, Abstract). Thus, for all of the above reasons, the Applicants respectfully contend that claim 6 of the present invention is not made obvious by the combination of Chaudhuri, Ruetsch, Levy and Castelli.

Furthermore, dependent claims 8-10 depend, either directly or indirectly, from claim 6 and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 8-10 are also patentable and not made obvious by the teachings of Chaudhuri, Ruetsch, Levy and Castelli. As such, the Applicants respectfully request the rejection be withdrawn.

CONCLUSION

Thus, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 842-8110 x130 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully Submitted,

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